

THE MANUFACTURE OF LEATHER.

The Manufacture of Leather. By H. Garner Bennett.

Pp. xxi+420. (London: Constable and Co., Ltd., 1909.) Price 16s. net.

IN this work the author has attempted to produce a volume which shall be a text-book to meet the needs of candidates for the examination of the City and Guilds of London Institute, and for the degree and diploma examination of the leather students of the Leeds University. The book is also evidently written for the use of the practical tanner who possesses a limited knowledge of chemistry. We do not think that the author has been altogether successful. The proportion dealing with the scientific aspect of leather manufacture (specially noticeable in the chemistry of the tannins), and the chapter on tannage of chrome leathers, stand out in brilliant contrast with the other part of the book, particularly with the somewhat sketchy and superficial chapters dealing with the practical tanning of sole, belting and harness leathers.

The first five chapters deal with the nature of the skins, fermentation, hides and skins, and water; the author then passes to the first practical process of leather manufacture, viz. soaking, describing the various processes employed. He next deals with the various methods of removing hair and wool, together with a full description of the tools and machinery used for the purpose. Chapter viii. deals with the deliming of hides, a process which has now become universal, owing to the increased technical and scientific knowledge. In chapters ix., x., xi., the author brings together in handy form the chemistry of the tannins, the tanning materials and the methods of analysis. The next chapter deals with the preparation of the tanning liquors and the manufacture of extracts. In this, the author has gracefully glided over a very important subject, and has not dealt with many of the important changes which take place in the leaching nor dealt with some of the most recent plants devised for this purpose. The whole subject of extract manufacture is referred to in two printed pages, whereas on such an important subject as the manufacture of extract, which now forms almost 50 per cent. of the material for modern sole-leather tannage, it might have been expatiated upon at considerable length with advantage to the student.

The next chapters then deal with the tannage of sole, belting and harness leather previously referred to. In the chapters on the tannage of chrome leather but little detail has been given for the practical manufacturing process of this leather. The author then proceeds to the consideration of alum, fat, oil and aldehyde tannages, and to drying of leather, finishing of sole leather, currying and finishing of dressing leather, the dyeing and finishing of light leathers, and the finishing of chrome and other leathers. A special chapter deals with the enamelling and japaning processes and the dressing of wool rugs. This concludes the practical part of the book, at the end of which is a short chapter on the analysis of leather.

The scheme is comprehensive, but the author has

failed to bring out any novel feature which has not been dealt with, at least equally satisfactorily, by other authors. The work cannot be looked upon as a standard text-book for the practical tanner, but may certainly appeal to those who, having a knowledge of practical leather manufacture, desire to study further the scientific principles.

The book is well illustrated by photographs of machinery taken from the well-known illustrated catalogues of leather trades' engineers. These do not show the essential features of the machines, but are simply photographic blocks; in no case are the essential principles of the machines described.

MEMOIRS ON MARINE ZOOLOGY.

Liverpool Marine Biological Committee's Memoirs.

XVIII., Eledone. By Annie Isgrove. Pp. viii+105; 10 plates. Price 4s. 6d. net. XIX., Polychæt

Larvæ. By F. H. Gravely. Pp. viii+79; 4 plates. Price 2s. 6d. net. (London: Williams and Norgate, 1909.)

THE editor—Prof. Herdman—is to be congratulated on adding these two useful memoirs to his well-known series. Miss Isgrove has given a clearly written account of a common cephalopod, for which she prefers to retain the well-known Lamarckian name rather than to adopt the name Moschites, which is its correct designation, according to the strict rules of nomenclature. In the first part of the volume interesting observations are recorded on the habits and food of this octopod, and on the conditions under which it has been found in the neighbourhood of Plymouth and Port Erin. Attention is directed to the great preponderance in number of the females, the relative proportion of the sexes of captured specimens being about fifty females to one male. In the following sections of the book the author gives an account of the external features and internal structure of the animal, considering each system of organs in turn. The morphology of the funnel, which is one of the most characteristic organs of the Cephalopoda, is worthy of more extended reference; the sections which deal with the foot and funnel contain no allusion to the homology of the latter with the epidium of gastropods; this homology is merely parenthetically mentioned, fifty pages later, under the description of the pedal ganglia. The alimentary canal, the circulatory and excretory systems, the nervous and reproductive organs, and the spawning are carefully described, the account of the structure of the gills and the anatomy of the nervous system being worthy of special mention. In the section on the structure of the retina, the author speaks of a *nerve fibre* instead of a neurofibril, running along the axis of each retinal cell. The memoir is well illustrated by means of ten lithographic plates containing above eighty carefully drawn figures.

Mr. Gravely has essayed a difficult task, namely, to give an account of the polychæt larvæ which may be captured in the tow-net at Port Erin during the month of July. The complete identification of many of the larvæ so obtained is impossible, since their characters

are totally different from those of adult worms. It is only exceptionally that such larvæ can be reared, in aquaria, to adults, and their identity definitely established. In many cases the larvæ do not present clear specific or even generic characters, and they can therefore be referred only to their respective families. The author has written a careful and detailed account, in most cases drawn from living specimens, of the principal larval forms captured, some of which have not been previously described. Measurements are given of the length and diameter of the larvæ, of some of the parapodia and setæ, and of the cilia; and the colour markings are recorded. The larvæ dealt with are as follows:—three Syllids, several Polynoids, three Phyllodocids (including *Mystides* and probably *Eulalia*), *Nephthys*, *Spio*, and four other Spionids, one of which is possibly the larva of the elusive *Pœcilo-chætus*, *Polydora*, and two other Polydorids, *Mage-lona*, *Chætopterus*, and *Pectinaria*, the metamorphosis, to the young adults, of the metatrochophoral larva of the last-named being described. The account of these larvæ, which is illustrated by means of forty-seven figures, will be welcome to many workers on plankton and on polychæts, and, although it is admittedly a preliminary account, it forms a good basis on which to found future observations. The reader is referred for a definition of the numerous technical terms employed in describing the different stages and larval organs to a recently published paper by the same author, but it would have been a considerable advantage and convenience to the reader if brief definitions of these terms had been given at the beginning of the present memoir.

We suggest to the editor of these memoirs that all the volumes published in the future be provided with a table of contents.

ENGINEERING SCIENCE.

- (1) *Applied Mechanics, Embracing Strength and Elasticity of Materials, Theory and Design of Structures, Theory of Machines and Hydraulics. A Text-book for Engineering Students.* By Prof. David Allan Low. Pp. vii+551. (London: Longmans, Green and Co., 1909.) Price 7s. 6d. net.
- (2) *Strength of Material: an Elementary Study prepared for the Use of Midshipmen at the U.S. Naval Academy.* By H. E. Smith. Second edition. Pp. ix+170. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1909.) Price 5s. 6d. net.
- (3) *Stresses in Masonry.* By H. Chatley. Pp. viii+142. (London: C. Griffin and Co., Ltd., 1909.) Price 3s. 6d. net.

(1) THE subject covered by this book is a very extensive one, and the author is to be congratulated on the fact that by judicious compression, without sacrifice of clearness, he has in a volume of only 550 pages covered ground to which usually two or three bulky text-books are devoted. No student can expect, however, to make himself master of the contents of the book unless, as the author himself suggests in his preface, he works conscientiously

through the sets of carefully thought-out problems which are given at the end of each chapter. At the end of the first, or introductory, chapter, Prof. Low has given a fairly complete bibliography for the subject, confining himself to works in the English language which have appeared during the last decade, or to those works which have been brought up to date by new and revised editions; this list will be found of considerable use by students who desire to extend their reading in any one branch of the subject.

The first five chapters are devoted to a series of introductory problems, work and energy, polygon of forces, moments and centroids, and for these latter both graphical and analytical methods are discussed; then follow six chapters on strength of materials. In the chapter dealing with compound strains and stresses, the opinion is expressed that in the case of ductile materials, such, for example, as mild steel, it is the resistance to shear which determines the strength, and reference is given to the experimental work of Guest, Hancock, Scoble, and others in investigating this problem. The whole of this chapter is well worth the careful study of the young engineer, who should not be content to leave it until he feels that he has made himself a thorough master of the principles laid down, and of the formulæ deduced for practical use in design work. Another chapter in this section which contains a well-arranged mass of information is that on the behaviour of materials in the testing machine; the latest memoirs have been summarised, and the conclusions to be drawn from these experimental investigations are clearly set forth.

In chapters xii. to xv. stress diagrams and the design of roofs and bridges are discussed, and, though of necessity there is much condensation, all the important points are clearly brought out. A student who has mastered this section will find that his work is much simplified when he comes to the study of one of the more advanced text-books specially devoted to this branch of engineering work.

The next eleven chapters are devoted to the subject of mechanism; such details as friction and lubrication, governors, toothed gearing, balancing of revolving and reciprocating masses, &c., are discussed in a satisfactory manner, and velocity and acceleration diagrams and crank effort diagrams receive due attention, though there is nothing novel in the method of treatment.

The last section of the book treats of hydraulics; the flow of water over weirs and through orifices and pipes, loss of head due to various causes, and the impact of jets on vanes are all in turn discussed, and the application of these principles to the design of such hydraulic machinery as water-wheels, turbines, pumps, and accumulators is then explained.

Prof. Low has succeeded in writing on a well-worn subject a text-book with many new features, and one which should find a place on the bookshelf of every young engineer.

(2) This small text-book was prepared for the use of the midshipmen at the U.S.A. Naval Academy in connection with one of the courses in the department of mathematics and mechanics. It deals, therefore,